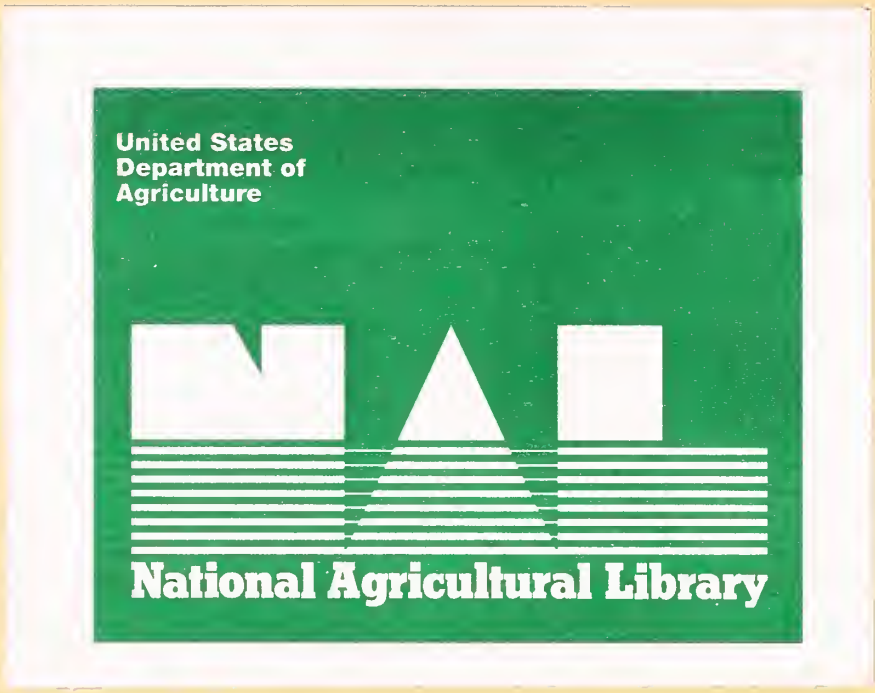
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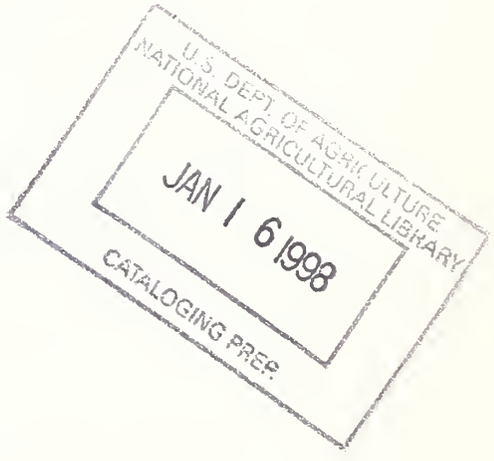
Report and Analysis of the Need for Strategic Stockpiling of Food in the United States and its Territories and in Foreign Countries

A Report Developed in the
U. S. Department of Agriculture
Pursuant to The Agricultural Act of 1956
Eighty-Fourth Congress



United States Department of Agriculture
Washington, D. C.

January 1957

A REPORT AND ANALYSIS OF THE DESIRABILITY OF STRATEGIC STOCKPILING OF FOOD IN THE UNITED STATES, ITS TERRITORIES AND POSSESSIONS, AND IN FOREIGN COUNTRIES

The Agricultural Act of 1956 provides in Section 201(b) in part as follows:

> "(b) The Secretary shall submit to Congress within 90 days after the enactment of this Act detailed programs, with recommendations for any additional legislation needed to carry out such programs, ...(3) for strategic stockpiling of foodstuffs and other agricultural products (A) inside the United States and (B) outside the United States as authorized in Section 415 of the Mutual Security Act of 1954."

This report has been developed as a means of providing the presently available information for the report requested in the foregoing language. It reflects further study and examination of the problem as previously presented in a preliminary report to the Congress, dated August 24, 1956.

It is assumed that the term "strategic" in Section 201(b) of the Agricultural Act of 1956 is intended to refer to a need for stockpiling as a safeguard against shortages in the event of an enemy attack. Within the context of Section 201 of the Agricultural Act, it appears that the utilization of surplus commodities presently held by the United States Government is one of the objectives sought by Congress. In developing this report, however, it has been concluded that the subject must first be approached from the standpoint of determination of need for stockpiling without regard to the source of the commodities which it might be determined should properly be stockpiled for strategic purposes. Following such a determination, if it is concluded that some stockpiling measures are appropriate and desirable, it would then appear logical to consider the extent to which commodities in the inventory of the Commodity Credit Corporation might appropriately be included in such stockpiles.

The report deals with the question of stockpiling of food (1) in Continental United States, (2) United States Territories and Possessions, and (3) in foreign countries.

Summary

Continental United States

1. Strategic stockpiling of food for emergency use in the event of nuclear attack upon this country would present extensive difficulties and involve substantial costs. The inadequacy of suitable warehousing facilities, the difficulties of management and rotation of supplies, and other problems are such as to make stockpiling on a large scale undesirable if it can be avoided without undue risk to the population.

2. Regardless of final conclusions with respect to the establishment of a strategic stockpile of food, it is highly desirable that consumers throughout the United States maintain stocks of food in homes and all reasonable efforts should be made by the appropriate Federal agencies and the States to encourage such stocks.

3. Alternatives to stockpiling (such as relocation of critical processing, distributing and transporting facilities or the development of standby facilities) should be considered and careful advance planning undertaken, not only to minimize the need for stockpiling but also to assure effective functioning of the food economy in an emergency.

4. For the purpose of gaining perspective, analysis has been made of the need for stockpiling under the conditions assumed in Operation Alert 1956. It has been concluded that, under those conditions, stockpiling of domestically produced foods (other than in homes) would not be necessary, although shortages of imported foods, particularly sugar, might justify limited stockpiling of such items.

5. In the event a shelter construction program is undertaken as a matter of National policy to provide protection to the population in event of a nuclear attack, it clearly would be necessary to stockpile food in the shelters. If a shelter program is undertaken, it may be desirable, during the period of implementation of such a program, to accumulate food for stockpiling in shelters.

6. In the absence of a shelter program, the need for stockpiling would be dependent on conclusions with respect to enemy attack potential, and with respect to possible losses of population, food and other resources from such a potential attack. Such conclusions would include estimates of effects of radioactive fallout. Information which would permit full evaluation of these factors is not now available.

7. If it should be concluded that strategic stockpiling of food should be undertaken, it would appear desirable that most of the foods for the stockpile be accumulated by procuring foods in surplus supply. This would not necessarily reduce the difficulties or the costs of a stockpiling program except to the extent that purchases for this purpose are in lieu of other surplus disposal programs. The problem of rotation would still exist and except to the extent that some of the foods in the stockpile could be rotated into use through donation programs, it probably would be necessary that the bulk of the stockpiled foods simply be disposed of after the expiration of their storage life.

U. S. Territories and Possessions

1. There is a more urgent need for food stockpiles in the territories and possessions than in the continental United States, because

the territories and possessions are more dependent upon ocean transportation for major items of food. Shipments to them are likely to be curtailed during a war emergency, as during World War II.

2. Before food stockpiles can be established in the territories and possessions, it will be necessary to determine desirable amounts of individual food items, the most appropriate types and locations of storage facilities and the approximate cost of stockpiling. It would be necessary also to determine appropriate procedures for acquisition and management of the stockpiles. The feasibility of increasing commercial and home stocks should be explored, but it is likely that installation of some new facilities would be required.

Foreign Countries

1. Most of the costs and problems of establishing strategic stockpiles of food in the Continental United States would apply with equal or greater force in foreign areas.

2. The building up of strategic stockpiles in foreign areas is an operation that should be determined primarily by security needs and cannot be initiated from the point of view of surplus disposal.

3. Lack of adequate funds and other considerations have so far prevented any programs under Section 415 and foreign countries have generally implied that participation on their part would depend on the United States paying most or all of the costs.

4. Section 415 offers adequate legislative authority for U. S. assistance to foreign stockpiles and Public Law 480 provides possibilities for assistance in building up national reserves including strategic stockpiles in NATO countries or others.

5. In some instances where the transfer of ownership is final and the increase in foreign reserves can be considered as being on a relatively long-term basis, the disposal of surpluses in building up foreign stocks is in the interests of the United States even though prompt consumption is not achieved.

FOOD STOCKPILING IN CONTINENTAL UNITED STATES

A strategic food stockpile, as used in this report, refers to a quantity of food held either by the Government or by commercial establishments with Government assistance, processed into a form suitable for emergency feeding use with a minimum of additional preparation, and located in areas where foods are likely to be needed to supplement local food supplies for civilian use during a postattack period.

Some advocates of strategic food stockpiling have suggested that surplus foods presently held by the U. S. Government should provide a major source of supplies for such a stockpile. In determining the need for a food stockpile, the logical approach is first to determine the desirability of stockpiling food without regard to the source of the commodities which might be stockpiled. If it is concluded that some food stockpiling measures are appropriate and desirable, consideration should be given to the inclusion of commodities in surplus supply.

Any analysis of the desirability of stockpiling food involves two principal questions - (a) to what extent would there be an overall shortage of food in the continental United States following a nuclear attack, and (b) to what extent would there be local shortages of food.

The problem of determining whether or not a food stockpile is needed is complicated by the lack of knowledge of the type of attack which might occur. However, in the absence of any other official assumptions, it is possible to evaluate this problem in the light of an assumption of attack similar to that in Operation Alert 1956. It is recognized that more and higher yield bombs, with increased damage from heat, blast and radioactive fallout, could affect the need for food stockpiling. This report describes some of the conditions which might alter the conclusions reached on the basis of the Operation Alert 1956 attack pattern. The report also outlines some measures which might be considered as alternatives to food stockpiling. While some limited conclusions can be reached at this time, considerably more information and guidance are needed with respect to attack assumptions and the potential effects of radioactive fallout before conclusive findings and policy recommendations can be made on the stockpiling question. This report does not give consideration to the possible need for stockpiles under conditions of mobilization without attack.

Problems in Stockpiling Food

Conclusions with respect to either a national stockpile or area stockpiles must take into account not only the considerations which might indicate a need for stockpiles, but also the obstacles and difficulties which would be involved in such an undertaking. These difficulties and obstacles are reviewed here in order to make completely clear that the

need for strategic stockpiling must be urgent and compelling to justify the substantial expenditures in manpower, money and other resources and the probable adverse effects on food markets.

Rotation of stockpiles: If stockpiling of any food should be undertaken, perhaps the most complex problem involved would be that of rotation and management of the food supplies involved. A stockpile developed for feeding of evacuees and refugees immediately following an attack would include primarily foods in a form (or readily convertible into a form) suitable for immediate consumption by evacuees and others. Foods of this character, although storable for substantial periods of time under satisfactory storage conditions, nevertheless would have to be rotated into use before they deteriorate and replaced with fresh supplies, or alternatively, they would have to be disposed of after the expiration of their storage life. The methods of disposal of old stocks would include: (1) Sales to the trade, (2) donations to the School Lunch Program and to other domestic and foreign outlets, and (3) destruction. If stockpiling is undertaken, it would be appropriate to study these alternatives as they apply to each stockpiled item and plan for disposal which would be least disruptive to the market, least cost to the Government and most in the public interest.

Rotation of Government-owned stockpiles of food through commercial trade channels would be difficult since the stockpiled foods might not be in the package sizes or forms generally used by the public. Furthermore, financial loss often would be substantial due to necessary discounting for age of the stocks. It would be difficult, of course, to distribute stocks through commercial channels without interfering with marketing by farmers and the food industry. Government outlets, such as school lunches, could utilize only limited amounts of the food stocks to be rotated. It must be concluded that much of the original cost of the stockpiled food could not be recovered and that additional expenditures would be involved whenever replacement of food in the stockpile became necessary.

Currently the only Government-owned foods in forms suitable for stockpiling are cheese and nonfat dry milk, although some additional commodities could be converted into forms suitable for this purpose. Wheat, for example, might be converted to flour. The great majority of the items which would be required in a well-rounded stockpile, however, are items which are not now owned by the Commodity Credit Corporation. However, while the Commodity Credit Corporation does not now hold any meat, eggs, lard, sugar, fruits, vegetables, shortening, or coffee, many of these items are, from time to time, purchased and distributed to available outlets, as a means of relieving depressed market conditions. If such foods are procured for stockpile purposes it would be essential that there be a clear understanding that the levels of stockpiles would be maintained except in case of emergency. Otherwise, the additional stocks of these commodities would have a depressing effect upon prices, thus resulting in unfavorable economic consequences to both producers and distributors.

Location and storage of food stockpiles: Any food stockpiles deemed necessary for strategic purposes would logically be stored in localities somewhat removed from the centers of population which are vulnerable to enemy attack, but accessible to evacuees. Suitable storage facilities for a stockpiling program generally are not available in these dispersed localities since normal peacetime distribution practices have not generally resulted in concentrations of foods at such locations. Although it appears that a considerable amount of storage space is available, such space is of a type which would not likely permit retention of stored foods for their maximum storage life. Therefore, the implementation of a stockpiling program probably would require substantial new construction or renovation of existing storage facilities. This is particularly true if maximum storage life of commodities is to be achieved. Generally speaking, the storage life of processed commodities is substantially longer when held at 40 degrees Fahrenheit temperature compared to higher temperatures. Thus, wheat flour, for example, can be stored safely in multiwalled paper bags for about a year at 70° and for about two years at 40° Fahrenheit (Appendix Table 1). Humidity also affects storage life. Margarine loses its freshness in two years at 70° Fahrenheit but remains in good condition for five years at 40° Fahrenheit. Most items may be held two to four times as long at 40° Fahrenheit as at 70° Fahrenheit. Obtaining such specialized storage would be a major cost in food stockpiling.

Stockpile management: Once established, a stockpile of food could not be forgotten. Regular inspection and rotation would be required to assure that the condition of the stored commodities would remain at an acceptable level. Evaporated milk, for example, a desirable stockpile item for infant feeding, must be inverted periodically to maintain condition. Experience of the Commodity Credit Corporation in the maintenance of its stocks indicates that the cost of management is substantial.

All of the foregoing factors necessarily must be taken into account in arriving at a decision with respect to stockpiling. Clearly, a strategic stockpile would involve substantial expenditures of money and would require continuing expenditures for replacement and maintenance if the stockpile is to serve its intended purpose. The need for stockpiling, therefore, must be examined critically and it must be clear that there is no satisfactory and less costly alternative for the safety of our population before undertaking this difficult and expensive task.

National Stockpile of Domestically Produced Foods

It is pertinent, in considering the need for a national food stockpile, to review the makeup and characteristics of our normal food supply, the normal levels of stocks, and distribution practices. As will be noted from the discussion which follows, substantial amounts of readily available foods outside target areas tend to reduce the need for food stockpiles.

Farm stocks of food and feed: An important element in the food picture is the large (and at present excessively large) stocks of grains and livestock in the country. Farmers and dealers normally maintain reserves of grain and hay to feed their livestock from one harvest season to the next and many farmers maintain reserves to help avoid serious shortages in years when weather may be less favorable than normal. Current stocks of both food grains and feed grains, however, are substantially larger than are normally considered desirable. Likewise, there are on American farms more than 90 million head of cattle and large numbers of hogs and poultry, which, like the grains, represent large quantities of food that can be quickly converted into forms desired by consumers. It would be possible to draw on these reserves in time of emergency to meet food requirements of all claimants. These stocks of grains and livestock are a widely distributed supply of raw food products which need only to be processed.

Other food stocks: Processors, distributors and consumers also hold large quantities of foods in all parts of the country. The stocks held in homes, retail stores and wholesale establishments in target areas would be most affected by nuclear attack, but only a small proportion of total annual supplies of most foods are held in these areas at any one time. Processors' stocks of some kinds of domestically produced foods are held predominantly in target areas but here, again, the stocks at any given time would constitute only a small percentage of the total annual supply of food.

Daily produced foods: Supplementing the distributor and processor stocks would be the daily produced foods. These would include poultry and livestock products, some of which are produced in considerable volume in most parts of the country. Fresh fruits and vegetables from local production would be available in season. Stocks of daily produced foods are small at all times of the year, primarily because they are highly perishable (Table 2). These daily produced items include nearly half of the total caloric value of foods consumed in the U. S. (Table 3).

Other factors to be considered: Because of the greater concentration of people than food in target cities, a nuclear attack such as assumed in Operation Alert 1956 probably would destroy proportionally more people than food. Storage of food generally is located near points of production until it moves into the distributive channels of trade, so that an attack on population centers would affect to only a minor extent the major supplies and sources of most foods. The analysis of effects of Operation Alert 1956 indicated that the loss of population would be about 7.7 percent. The loss of food (in terms of annual supplies) was estimated to be substantially less than this proportion. It is possible that foods assumed to have been lost because of fallout in Operation Alert 1956 may have been salvageable. On the other hand, the effect of fallout on food production might be greater than was estimated under Operation Alert 1956.

Much more information is needed, however, to determine whether the possible damage from fallout might cause shortages that would require food stockpiling. Assumptions of more and/or higher-yield weapons would, of course, magnify the fallout problem.

The estimated possible destruction of processing facilities under Operation Alert 1956 might cause temporary national shortages of some domestic products, such as canned fruits and vegetables, yeast, margarine, vegetable shortening and refined edible oils. Nearly normal supplies of other foods would be available. A nuclear attack also might cause national shortages of tin plate and other materials and supplies essential for processing food, but this factor was not of significant proportions in Operation Alert 1956. The need for stockpiling such items, however, should be given further consideration.

Need for Stockpiling of "Imported" Foods 1/

An analysis of foods that are obtained largely or totally from foreign countries and territories indicates more serious emergency supply problems than for domestically produced foods. U. S. ports might be expected to suffer heavy damage in a nuclear attack, and ocean shipping undoubtedly would be seriously affected, at least temporarily. The strategic military plans would affect the availability of shipping and this in turn affects the need for stockpiling. A resume of pertinent facts and considerations with respect to our principal food imports follows 2/:

Sugar: Among our agricultural imports, sugar constitutes by far the greatest tonnage. About three-fourths of the domestic sugar requirements are obtained from domestic offshore and foreign sources. Wartime sugar import requirements from foreign countries are estimated to be in excess of four million tons annually, or about one-third of all imports of agricultural products. Also, about two million tons per year come from Puerto Rico, Hawaii and the Virgin Islands. Raw cane sugar refining capacity is concentrated in coastal cities considered to be priority targets for any nuclear attack on this country. In addition, the northeastern states which would likely suffer the heaviest attack damage are normally dependent on offshore sugar and would be most difficult to supply with domestically produced sugar. It is estimated that about one-fourth of the U. S. sugar stocks would be damaged or destroyed by a nuclear attack, such as that assumed for Operation Alert 1956. Such an attack also would cause a temporary loss of about 60 percent of the refining capacity for offshore raw sugar. In the absence of a stockpile of sugar in nonvulnerable areas, a severe postattack shortage of sugar could be avoided

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1/ Imports in this section include amounts received from Hawaii, Puerto Rico, and the Virgin Islands, as well as from foreign sources.

2/ Table 4 in the Appendix shows amounts of major agricultural products imported in 1955.

only by a rapid and substantial increase of inshipments of sugar. If any agricultural items are to be included in a stockpiling program, it would appear that sugar would be on such a list. Sugar can be stored for long periods of time with little effect on quality and stocks could probably be rotated with less disruption to markets and prices than for most other products.

Molasses: By tonnage, molasses is our second largest agricultural import, totaling from 2.0 to 2.5 million tons annually. Essential food uses for molasses, such as for manufacture of yeast, could be supplied out of domestically produced supplies. Molasses is an important ingredient in livestock feed and for commercial alcohol. Stockpiling of molasses for food or feed would appear to be ruled out by difficulties in transportation and in storage, the availability of other types of animal feeds, and the availability of some domestically produced molasses for essential food uses.

Coffee: By weight, coffee is our third largest agricultural import and by value, our most important agricultural import. None is produced within continental United States. Coffee, itself, has no actual food value and its consideration for stockpiling is based on its importance as a morale builder. It was among the first items rationed during World War II and the rationing was the result of shortages of shipping rather than shortage of coffee in the producing areas. In a nuclear war, shipping shortages and lack of port facilities might be expected to limit coffee imports. A decision on whether or not to stockpile coffee should be based on an evaluation of the cost of such a stockpile against its importance in building and maintaining morale. It appears probable that any coffee stockpile should be in the form of green coffee beans or vacuum packed coffee.

Tea: The volume of tea imports is small relative to coffee and sugar. Tea has no food value but is important from a morale standpoint. All tea is imported and nearly all comes from relatively long distances and from areas where there might be considerable shipping risks in wartime. Tea, it would appear, should be considered for inclusion in any national or area stockpile.

Cocoa: This country is completely dependent on imports for cocoa beans and other forms of chocolate. Cocoa products have both dietary and morale value and, like tea and coffee, would be items for consideration in establishment of any national or area stockpile.

Spices: Many of the spices used in seasoning and preservation of foods are imported from distant areas from which it might be difficult to obtain supplies in wartime. Very little information is available with respect to household and industry stock levels, but it is likely that available supplies of most spices in households and at retail and wholesale would meet consumer needs for a considerable period of time.

However, processor stocks of spices as well as the facilities for grinding, processing and packaging are concentrated in vulnerable areas and a major share might be damaged or destroyed by nuclear attack. Pepper and possibly other items merit consideration for stockpiling, but the entire group requires further study and analysis before final conclusions can be reached.

Oilseeds and oils: Peacetime imports include about a half million tons of vegetable and animal fats and oils and oilseeds. Certain special products in this group are already included in our national strategic stockpile because of their industrial and military uses. These types represent a relatively insignificant part of our total imports, the bulk of the imports being used for production of soap and related products. Since this Nation is a large net exporter of fats and oils, it appears doubtful if any imported fats, oils or oilseeds need to be stockpiled for their food value. There are no food uses for imported fats and oils for which domestically produced products cannot be satisfactorily substituted for the imported items. Any stockpiling of these items would have to be justified on the basis of their non-food uses.

Fruits and vegetables: This Nation receives from offshore sources large quantities of fruits, particularly bananas and pineapples, and some vegetables. With the exception of canned pineapples, most of these receipts are fresh fruits and vegetables and thus could not be stockpiled. However, since canned pineapple and other imported canned fruit and vegetable products supplement similar domestically produced commodities, separate consideration is not deemed necessary and the need for stockpiling these imported canned fruits would depend on the same factors used in determining the need for stockpiling other canned fruits.

Fish and meat: A major part of our fish and meat imports are in perishable form and, as such, are unsuitable for stockpiling. Canned fish and meat whether domestically produced or imported would be valuable for emergency feeding and, if food stockpiles are determined to be desirable, might be considered, along with domestically produced supplies, as a source for stockpiling. It appears doubtful, however, that it would be necessary to rely on imports to obtain canned meat or fish for stockpiling purposes.

Area Stockpiling Considerations

The foregoing discussion is concerned with questions related to national food stockpiles. If a national stockpile of any food is determined to be desirable, an area by area study would be needed to determine appropriate placement of the stocks. Even though a national stockpile is not desirable for conditions assumed under Operation Alert 1956, area stockpiles might be advisable if there is likely to be (1) a temporary breakdown of the normal distributive system because of such factors as disruptions of communications, credit facilities and labor supply, (2) a severe shortage of transportation facilities available for food or

(3) the rendering inoperative of a major portion of the local processing facilities in any area. Any one of these conditions could cause a significant local shortage of food. In other words, area stockpiles could buy time in which to restore normal or near normal processing, distribution and transportation.

If consideration of the radioactive fallout hazard results in the institution of a shelter program as a matter of National policy, these same considerations would also justify the creation of food stockpiles in the shelters.

Distribution considerations: Potential local shortages can be minimized by a program to ensure continued distribution of foods. For example, food processors and suppliers could be given assurance that deliveries of food could be made without risk of financial loss and that foods consigned to wholesalers whose facilities were destroyed would be accepted by the responsible authority and that just compensation would be provided. Immediate reorganization of the distributive system would be necessary for all foods, particularly for perishables, such as fruits, vegetables and milk, to redirect food movements on the basis of the redistribution of people and to minimize spoilage of food. This would require coordinated national, state and local planning and would depend in part on local evacuation plans. Increased or quicker availability of fresh foods would mean better emergency period diets and less dependence on commercial stocks or special stockpile food supplies. In case of any attack, the Department of Agriculture would advise how and where to market perishable foods in the period immediately following an attack.

Transportation availability could be the most important single factor in determining the extent of need for local stockpiling of food for an emergency. Short or partial interruptions in availability of transportation facilities for food would not cause serious shortages of food items in most instances, except possibly for milk, bread, and certain fresh fruits and vegetables which are generally delivered to consumers on a daily or semiweekly basis.

When the cost and complexity of stockpiling is considered, there can be no doubt that the assignment of high priority to food movement would be fully justified, even under the most serious attack situation. On the basis of the present analysis of conditions under Operation Alert 1956 assumptions, area stockpiles of domestically produced food probably would not have been justified. In this exercise, the transportation agencies indicated that rail or truck transportation could be restored into all major sections of the country within a very few days following the assumed attack. Railroads indicated that they could restore lines or by-pass damaged areas and continue to move freight. Truck traffic, as well as railroad traffic, would have suffered some delay and required rerouting as a result of loss of key bridges but trucks are easily rerouted and

truck movement of food probably could have been restored to evacuation areas as quickly as communications could have been restored to advise what, where and how much food was needed and what damage had been done to roads and facilities.

Under assumption of a more severe attack than that envisaged in Operation Alert 1956, greater delay in reactivation of transportation would probably occur, due to greater damage to facilities, as well as more extensive radioactive fallout. However, this emphasizes more strongly the need for high priority for food movements when facilities are operative and to more intensive planning for emergency food shipments.

Biological warfare: It is possible also to visualize other problems, such as introduction of biological warfare agents, which could reduce the national food supply or the supply in a particular area. The current assumption of the Federal Civil Defense Administration with respect to biological warfare and the food supply is as follows: "It is assumed that biological warfare agents will be employed against animals and crops especially if long-term recuperative power gives indications of being a decisive factor. Use of this weapon on any large scale is unlikely in the initial blow." 1/ Accordingly, this factor has not been considered further in this report.

Stockpiling food in bomb shelters: If at some future date a program is undertaken to provide shelters for large numbers of people, as protection against blast and fallout, such shelters would need to be stocked with food. The volume of these food stocks should be adequate for the number of people to be served for the expected period of pin-down. This assumes that after this period it would be relatively safe for people to leave the shelters and use food stocks in the area or move to other areas. Shelters would need to include storage space and facilities for preparation and serving food. The nature of the facilities provided for preparation and serving food would, at least in part, determine the kinds of foods and their form in the stockpile.

Generally speaking, such stocks would be fully processed and highly concentrated foods mostly in cans. Refrigeration and cooking facilities would appear practical only in very large shelters.

A food stockpile program for shelters probably would need to be adapted to conditions prevailing in the shelters. Where no cooking facilities would be provided, emphasis would need to be on foods which could be eaten out of the can, such as meat and beans, spaghetti and meat balls, chicken and noodles. Water would be necessary for drinking and food preparation, as well as for sanitation requirements. If bread is not

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1/ FCDA Advisory Bulletin No. 204, September 4, 1956, page 3.

expected to be available, canned crackers might be included. Canned or dried fruits and vegetables would add balance to the diet but would not be dietarily essential in a brief period. In shelters having cooking and baking facilities, a less expensive veriety of foods could be stockpiled. Thus, any stockpiling program should vary with the food preparation facilities to be provided in the shelter.

The content of a shelter food stockpile would need also to vary with the people it is expected to serve. For example, a food stockpile for a shelter serving an office building probably would contain coffee while one for a school should include dried milk. A stockpile for a shelter in a residential area would need to contain baby foods and canned milk as well as food for adults. Special dietetic foods might be stockpiled in a shelter serving a hospital.

Since the food stockpiles for shelters usually would be concentrated and highly processed, the unit costs of such food stocks is likely to be relatively high. It would require careful planning and management to keep such foods stocked in the shelters in the proper proportions, to prevent damage, pilfering and spoilage, and to rotate these stocks (to the extent rotation is feasible).

Food Losses under Assumptions of Operation Alert 1956

An attack of the magnitude of Operation Alert 1956 would have caused destruction of some food stocks, food processing and distributing facilities, and some production resources. While it is difficult to assess the full extent of such destruction, it appears unlikely that destruction of actual food supplies would have been of substantial magnitude in relation to annual production. In the case of food processing and distributing facilities, some categories would likely suffer substantial damage and makeshift arrangements and substitution might be needed to replace temporarily these damaged facilities. However, under the assumptions of the 1956 Operation Alert it appears extremely unlikely that people would have been deprived of essential amounts of food due to the loss of stocks or of processing facilities. Different assumptions would produce different destruction patterns, but the analysis made during the alert provides some perspective.

Livestock and meat: Assumed losses of live animals and meat stocks in the target areas would have been less than one percent of annual production. Losses caused by fallout were assumed to have been less than two percent of annual production. Loss of processing facilities in Omaha and Chicago would have created temporary local problems that would have required some significant diversions in livestock and meat marketing, but other processing facilities could have increased their operations and handled all livestock marketed for slaughter. Nationally, more meat would have been available in the immediate postattack period than consumers would be expected to want but distribution might have been a problem in

local areas. There would have been less canned and processed meat but more fresh meat than is normally available.

Poultry and eggs: Losses of live poultry, poultry meat and eggs would have been small. Stocks of dressed poultry and eggs normally represent only one week's consumption and only part of this would have been lost. The largest loss would have been frozen eggs stored in cities. Less than 10 percent of poultry processing facilities are near the Operation Alert 1956 target cities. Only part of them would have been damaged and other plants could have increased their operations to offset this loss. With the estimated loss of population, there would have been some local surpluses of poultry products.

Dairy products: Stocks of dairy products in bombed cities were assumed destroyed. Fallout would have resulted in milk from some areas being unusable but the extent of such areas was unknown. Adequate total supplies of milk would have been available. Local shortages and surpluses could have resulted from transportation interruptions. Up to 15 percent of the processing facilities would have been damaged or unusable and there would have been some transportation problems in diverting milk from affected areas to processing plants in other areas.

Fats and oils: The heavy concentration of oil stocks in target areas would have resulted in heavy damage and destruction of stocks, particularly in the Northeast. Oil refiners also are heavily concentrated in bombed areas and insufficient capacity would have remained to handle available and needed oil. Losses of oilseed crushing facilities would have been low, except for flaxseed, but the remaining refiners would have been unable to handle the volume of oil from crushers. Immediate replacement or rehabilitation of at least half of the oil refineries that would have been destroyed was believed necessary. Peanut butter plants are also concentrated in areas assumed to be damaged. Until essential refineries would have been restored, lard and butter would have remained available but supplies of shortening and margarine would have been relatively short.

Cotton: Less than 4 percent of the supply would have been destroyed. The huge surplus would have been adequate for all needs. Loss of the chemical linters pulp plant at Memphis might have caused problems for users of its products. No other significant problems from loss of stocks or facilities would probably have resulted.

Tobacco: No major problems were noted for tobacco. There would have been only minor losses of manufactured cigarette stocks. Some damage to cigar manufacturing facilities and stocks would have occurred.

Naval stores: Very little blast or fallout damage to naval stores would have resulted from the attack. Substitutes would have been available for some of the uses for these products.

Wet corn milling: Two plants out of 14 were located within assumed fallout areas and might have been temporarily unusable. Capacity of these two plants is about a third of the total of the industry. Demand for these products for industrial uses would likely have also been considerably reduced.

Dry corn milling: About 9 percent of capacity would have been damaged or destroyed. Other plants could have increased milling to offset this loss.

Yeast industry: Up to 40 percent of the manufacturing facilities would have been destroyed, damaged or in fallout areas. This would have created serious problems in distribution but available supplies could have been stretched to cover essential needs for bread and other uses, if priority transportation could have been provided. This appears to be a potential problem area but storage problems would appear to make stockpiling impractical. Alternate manufacturing facilities in nonvulnerable areas may be needed.

Fruits and vegetables: There would have been heavy damage to processor and distributor stocks of canned fruits and vegetables. This loss could have been as high as 40 percent. However, the time of the alert was just prior to the packing season for most fruits and vegetables, when processors' inventories were at the low point for the year and most of the remaining stocks were in the hands of the highly vulnerable establishments of distributors. Thus, these losses would have been a relatively small percent of a year's supply of fruits and vegetables. Fallout would have made some growing crops unusable. About 5 percent of the total processing facilities would have been destroyed and losses would have been much higher in some important areas such as California, Philadelphia, Pittsburgh and Chicago. A problem might have resulted from shortages of cans for processors. Many of the normal market outlets for fresh products would have been disrupted. Development of new routing and marketing patterns would have become necessary immediately after an attack to avoid huge losses of perishable foods through lack of markets.

Coffee, tea and spices: There would have been heavy losses, both of stocks and of processing facilities. Shortages would be expected until increased imports could have restored the supplies to about the "normal level" and until alternative processing facilities could have been placed in operation. Coffee roasting equipment was presumed to have been heavily damaged in the Operation Alert problem but if green coffee beans were available, peanut roasters and other emergency equipment could have been used to roast the coffee. Most grocery stores have grinding equipment. Fancy packaging and vacuum packing would not be necessary.

Sugar: About 62 percent of U. S. capacity for refining offshore raw cane sugar would have been completely inoperative and about one-fourth of U. S. sugar stocks would have been damaged or destroyed in the attack.

Approximately 18 percent of Hawaiian raw cane mills and all of their refineries would have been damaged. However, there would have been no damage to beet sugar factories and raw cane mills on the mainland or in Puerto Rico. Replacements of lost stocks would have required stepped-up receipts of refined and raw sugar from offshore locations with resulting increases in transportation requirements. Unrefined sugar could have been used but controls would have been necessary on use and distribution of refined sugar at least in the period immediately following the attack.

Flour: About 28 percent of the flour milling capacity would have been damaged or destroyed but remaining mills could have met needs. This would have greatly increased the transportation problem because most of the undamaged facilities were long distances from flour-short areas. Assumed losses of flour stocks were estimated at 15 percent but would have been serious only until shipments could have arrived. There would have been no shortage of wheat for milling. During an emergency period feed mills might be used to prepare an emergency "flour."

Molasses: More than a third of the tank storage and terminal facilities are located in the assumed target areas. Also, there would have been some damage to barge-truck distribution facilities. A major problem would have been the lack of facilities to unload and store molasses in ports. Damage could have resulted in reduced supplies for livestock feed.

Grain storage facilities and stocks: There would have been heavy loss and damage to grain, located in terminal facilities varying from 10 to 50 percent of capacity in individual areas and totaling up to about 200 million bushels. This, however, would have represented only about 7 or 8 percent of the large supplies of wheat and lower percentages of most other grains. There would have been a difficult problem of routing shipments of grain to undamaged terminal facilities. Farm storage and other elevator storage would have suffered relatively light damage and the remaining elevators could have provided all necessary blending and cleaning services. Possible loss of grain stocks was not considered a major problem. Some damaged stocks of food grains could have been salvaged for livestock feed.

Refrigerated warehouses: About 41 percent of the refrigerated warehouse capacity was in areas damaged in the assumed attack. The greatest loss would have been in the Northeast. Loss of food would have been less than 41 percent, since some portion of the food in damaged facilities could and would have been salvaged and used. These losses would have amounted to no more than one to two percent of a year's supply of any major food group. This would have caused only temporary and local shortages of a few items, but the loss of the facilities would have created a lasting problem in distributing perishable foods in the affected areas.

Food distribution facilities: An estimated 30 percent of the wholesale distribution facilities and 15 to 20 percent of the retail facilities were in areas assumed to be bombed. Losses would have varied greatly by states

with the heaviest losses in New York, California, Maryland, Connecticut, New Jersey and Pennsylvania. Loss of facilities would have been a more lasting problem than the loss of stocks in warehouses.

Alternatives to Government Stockpiling

In view of the serious problems involved in any Government stockpiling program, it is imperative that the possible alternatives to such stockpiling be explored and undertaken to the extent they are found feasible in order to avoid the need for Government stockpiling or to minimize the amount of such stockpiling if it is subsequently found to be required.

These alternatives fall into four general categories:

1. Home food inventories of storable foods adequate for emergency use.

2. Dispersal of food wholesaler and chain store establishments to nonvulnerable areas.

3. Dispersal of food processing establishments to nonvulnerable areas.

4. Development by the food trades and local civil defense authorities of emergency operational plans to maximize utilization of food resources after attack.

Increasing home stocks: Regardless of decisions concerning national or area stockpiles of food, it appears highly desirable that families be encouraged to maintain adequate home supplies of foods suitable for emergency use. This would be most important for persons living in suburban and rural areas. Extra food supplies might be extremely important to these families in a critical postattack period, not only as a safeguard against shortages resulting from disruption of distribution, but as the only immediately available food supply if radioactive fallout in the area forces people to remain in their home shelters or basements until the fallout decays to a reasonably "safe" level. No form of commercial or Government stockpiling could accomplish so effectively the objectives of ready availability and wide dispersal which result automatically from maintenance of home stocks.

Increasing commercial stocks: Wholesale grocery and chain store groups might be encouraged to establish warehouses and stocks in nonvulnerable areas or to increase stock levels already in such areas. It seems probable that financial incentives would be essential to any real accomplishment in this direction due to the likely increases in operating and distributing costs of cooperating firms. Tax amortization and other financial assistance might be offered to private firms to encourage the installation of new warehouses outside of target areas, where needed. Limited Government compensation to private firms might also be required to

cover costs of maintaining larger than normal food stocks.

The primary advantages of such a program would be that: (a) Private firms could increase the efficiency of use of existing storage facilities, so that less new facilities would be needed than if the stocks were to be under Government ownership and management; (b) rotation of stocks would be "automatic" and orderly through established commercial channels, and (c) normal commercial operations would be established in nonvulnerable locations, thus reducing postattack disruptions in established patterns of food distribution.

Location of processing plants: Processing facilities for certain foods tends to be concentrated in target cities. A program to relocate a portion of these facilities in less vulnerable locations or for creation of standby facilities in such locations would not only reduce the need for stockpiling these foods but would reduce the urgency for postattack rehabilitation of facilities. Tax amortization allowances, for example, might be used to encourage the development of new facilities for vegetable oil processing, sugar refining and yeast production in the less vulnerable areas.

Such a dispersal program, of course, must be considered as a long range program, with little real accomplishment possible in a short period. This is true, too, with respect to distribution facilities. Thus, if a stockpiling program is determined to be necessary, these alternatives could not be relied upon for immediate accomplishment, but could merely supplement a Government stockpiling program over a long period of time.

Emergency food planning: Proper planning for emergency handling of local food supplies would reduce the need for Government stockpiling. A primary problem in supplying food to consumers in a period following an attack would be the distribution of food from the bulk shipments or stocks in or near the vicinity in which it is needed. Food wholesaling tends to be concentrated in or on the fringes of the larger cities. Such operations in non-target areas tend to be few in number and small in size, although there is a trend toward establishment of such facilities in the outskirts of cities. After an attack, the remaining wholesale distribution system in some areas would be inadequate for the increased number of people. This points strongly to the desirability for state and local civil defense people to develop emergency distribution systems and plans, including: (1) Development of alternate distribution points in assumed nonvulnerable area; (2) development of plans to distribute foods to emergency feeding centers, to retailers still in operation, and to emergency retail distribution points; (3) emergency readjustment of food processing, preparation and packaging to meet needs, such as milk processing, flour milling, bread making and butchering local livestock; (4) plans for rapid inspection of local food supplies and maximizing the use thereof; (5) preparation of advance estimates of food needs which can be readjusted rapidly in the light of reports on population changes and other factors;

and (6) planning for timely and orderly receipt and distribution of food.

Programming a Food Stockpile

If food stockpiling is adopted as national policy, care should be exercised in planning the acquisition of foods. Rapid acquisition of any large quantities of a predetermined list of food items would be likely to result in sharp price increases for such items, which in turn might result in an increase in production beyond that which would be desirable over any extended period. Such a result would be highly undesirable.

Under present agricultural conditions, a considerable number of items suitable for a food stockpile could be gradually accumulated by (a) processing agricultural products now owned by the Government into suitable forms for stockpiling and (b) diverting to a stockpile foods periodically purchased by the Government to relieve gluts in market supplies. Foods acquired under the second method for a national stockpile could be either in addition to or in substitution for foods acquired for donation to low income groups, public institutions and schools. The actual cost of foods stockpiled under both methods would be reduced to the extent that such foods would have been purchased anyway or taken from existing inventories. Also, stockpiling would increase the effectiveness in use of funds insofar as their purpose is to prevent excessively low prices by removal of excessive supplies of particular foods from the market. Foods donated to schools and relief agencies are consumed almost immediately. Although the level of consumption of these foods is increased by the donation program, to some extent the donated supplies replace food that would otherwise have been purchased from commercial sources by the users. This would not be true with foods placed in a stockpile unless the same or similar outlets were used to rotate stockpile supplies into use.

While the acquisition of food for a stockpile would be gradual by this method, over a period of time large quantities of suitable foods could be acquired for stockpiling. To the extent that purchases for such purpose replaced purchases for donation, the additional cash outlays required would be limited to the costs of processing, packaging, management and storage. Additional cash outlays would be required, of course, to the extent it was deemed necessary to purchase items not in surplus, or to purchase larger quantities than would normally be utilized through donation programs. To institute such a program, authorization would be needed from Congress to use available funds for stockpile purchases. Depending on the volume of purchases, additional funds would probably also be required and, in any event, funds would be needed to finance storage and management of the stockpile.

As already suggested, some of the foods acquired for the stockpile could be rotated into the same outlets as under current donation programs after the level of supplies had been built up sufficiently to accomplish the stockpiling objective. This suggests the possibility that arrangements might be set up to have the same distributing agencies that handle

supplies for school lunch and other outlets store and manage at least a portion of the stockpiled foods. While such a program would obviously increase the cost of storing and managing supplies above the costs incurred under the present "direct distribution" program, it would appear that a cooperative arrangement might be feasible. The cost, of course, would be further increased by the necessity of storing these foods in nonvulnerable locations.

FOOD STOCKPILING IN U. S. TERRITORIES AND POSSESSIONS

Stockpiling of food for emergency use in the U. S. territories and possessions might be justified by either the expectation that a considerable portion of the food stocks and food production capacity in the area would be destroyed during an emergency or that emergency conditions would prevent the movement of normal quantities of food to such areas.

The U. S. Department of Agriculture lacks adequate information on location and size of commercial and military stocks of food and facilities for storing food in the U. S. territories and possessions. Stocks of food and other agricultural products owned by the U. S. Department of Agriculture and located in these areas are negligible. Also, many of the foods which would be desirable components of food stockpiles in these areas are not now in surplus supply in the continental United States, or owned by the United States government in excess of immediate needs.

Availability of suitable unoccupied storage for holding increased stocks of food appears to be a limiting factor on food stockpiling, although some unused space is available in each of the territories. For example, on Oahu, the principal island of Hawaii, no reported space is farther than 4.5 miles from the center of Pearl Harbor, but relatively large amounts of storage space are available in quonset type buildings on the island of Maui in the Hawaiian group. Costs of storing stockpiled foods might be relatively high, especially in some areas, although the amounts would not be large. Some of the territories and possessions have climates which require specialized storage facilities. The problem of rotation of stocks and stocks management would also have to be solved. At least in Hawaii, the local merchants have expressed some interest in increasing commercial stocks as a safeguard against shipping disruptions.

An attack on any or all of the five target cities might seriously reduce food supplies in Alaska, Puerto Rico or Hawaii. Also the U. S. territories and possessions depend almost entirely on imports for many important items of food. Because of the almost complete dependence of these areas on ocean shipping for their imports and since this might be cut off or delayed in time of war, it would appear that the question of stockpiling of food in these areas deserves further careful consideration.

Specific assumptions are needed in regard to the effect of an emergency on the adequacy of ocean shipping for making deliveries of food to each of these territories and possessions. The assumption of no shipments of food for 60 or 90 days, as used in this report, is largely hypothetical. When essential assumptions are available, more attention can be given to preparing estimates of desirable amounts of foods for stockpiles and the development of feasible plans for storage and rotation of stockpile foods. Such food stockpiles might be desirable for use in either natural disasters or in case of war emergency.

The responsibility for planning to meet emergency period food problems in the territories and possessions is shared by the Department of the Interior, the local governments and the Department of Agriculture. It is recommended that Congress authorize and make available funds for detailed studies of the food stockpile needs of these areas and the problems that might be involved.

Alaska: Both the civilian and military population of Alaska are dependent on imports for most of their food. Alaskan production of food is very limited, consisting primarily of fish and small amounts of potatoes, some dairy products, a few fresh vegetables and some meat, a part of which is wild game. Fish is the only food produced in Alaska that is shipped to the United States in significant quantities.

The dependency of inshipments of foods is indicated by the fact that Alaskan production in 1954 amounted to less than two pounds of meat and two dozens of eggs per capita. Milk production was about 30 quarts per capita and production of potatoes per capita was about two-thirds of the rate of consumption of potatoes in the U. S. Fish and wild game would be available in substantial amounts during an emergency, although the major portion of the catch of fish is normally processed on ships at sea and delivered directly to ports in continental U. S. Even the slaughter of all livestock in the territory in an emergency would provide meat sufficient to supply the local demand for meat only for a period of two or three weeks. This includes breeding stock.

Inshipments of food by water amount to about 68,000 tons per year, or 110 pounds per capita in a 60-day period. Some additional supplies move into Alaska by truck over the Alaska Highway . It appears likely that normal stocks of foods are sufficient to meet the local needs for most items only for a period of two or three weeks.

Juneau, Anchorage and Fairbanks are listed as possible target areas. Whittier and Seward also are possible targets for an enemy attack. These cities contain a major share of the 161,000 civilians in Alaska, as well as a large part of the present storage stocks of imported foods.

The need for stockpiling food in Alaska would depend in part on the size of military food stocks in that area. Data regarding military food stocks are classified. If a method of rotation of stocks could be developed with the cooperation of commercial food distributors in the territory, stockpiling of non-perishable foods might prove practical, especially items such as flour, condensed, evaporated and dried milk, cheese, canned meat, canned fruits and vegetables, sugar, tea, coffee and fats and oils.

Alaskan officials indicate a serious need for stockpiles of food for a national emergency, but they state that Alaska does not presently have storage facilities available for food stockpiling. To provide facilities for storage of food stockpiles in non-vulnerable areas would be quite costly, and would involve relatively high costs of handling, transportation and management of the stocks. In addition, stockpiling would be complicated by the relatively wide dispersal of stocks that would be needed in an emergency. Nevertheless, it appears that a stockpile of perhaps 12,000 tons of concentrated foods in non-vulnerable areas should be given serious consideration. This amount would supplement normal supplies to provide civilians with at least minimum essential food requirements for about 60 days.

Hawaii: While the Hawaiian Islands produce large quantities of food, they depend on imports to supplement their own production. Import needs from U. S. in fiscal year 1955 were estimated to include: 57,000 tons of canned and preserved foods, 32,000 tons of rice, 20,000 tons of flour and 108,000 tons of feed for livestock. These amounts of rice and flour constitute about 200 pounds per capita for the civilian population of Hawaii, compared to the annual consumption of only 161 pounds of all grain products per capita in U. S. The Hawaiian Islands also import from foreign sources each year about 100,000 tons of fertilizers and about 10,000 tons of animal feeds, fish and other foods. It is estimated that a stockpile of about 8,000 tons of concentrated foods, as a supplement to normal supplies, would be sufficient to meet the essential needs of the population of Hawaii during a 60-day emergency period. An additional 8,000 tons of animal feeds would be needed, but this may not be essential. Stockpile requirements might be reduced by advance planning for increased production and utilization of local products, such as vegetables, bananas, fish and animal feeds.

The city of Honolulu is the only critical target city in Hawaii. Honolulu was the home of more than half of the 503,000 civilians in the Hawaii Islands in 1955. It is adjacent to Pearl Harbor and except for foods in distribution channels, most of the imported food stocks are held in this area. There are some storage facilities, however, on the islands of Oahu and Maui which might be suitable for stockpiling purposes. None of the available warehouses on Oahu is more than 4.5 miles from the center of Pearl Harbor. Construction of storage facilities in nonvulnerable locations on Oahu would appear necessary if a food stockpile is to be available to the bulk of the population in an emergency.

Most of the imported items are products which could be stockpiled if stockpiling is found to be desirable and if a satisfactory method for storing and rotating stocks can be developed. Livestock feeds, rice and wheat for flour are products available in U. S. government-owned stocks. Further study as to the need for stockpiling would appear desirable before any decision on stockpiling in the territory of Hawaii is made.

Puerto Rico: About 90 percent of Puerto Rico's food and feed imports normally come from the United States. Fish, corn, potatoes and meat are the major imports from other countries. Needed imports from the United States for the fiscal year 1955-56 were estimated by local officials to consist of about 102,000 tons of animal products and 377,000 tons of vegetable products to supplement domestic production of food.

Annual shipments of foods from the U. S. to Puerto Rico for civilians are about 33,000 tons of meats and fish, 34,000 tons of fats and oils, 53,000 tons of wheat flour, 150,000 tons of rice, 24,000 tons of beans, 27,000 tons of dairy products and eggs, 9,500 tons of salt, and 110,000 tons of other foods. This is a total of 440,000 tons. Animal feeds shipped in from U. S. amount to about 89,000 tons per year.

The importance of these imports to the people of Puerto Rico is indicated by the amounts imported per person. The annual imports of rice and flour alone total about 180 pounds per person in Puerto Rico, compared to the per capita consumption of about 161 pounds of all grain products in continental U. S. The import needs of dry beans in Puerto Rico amount to 24 pounds per capita of the population, compared to the U. S. per capita consumption of only about eight pounds per year. It is estimated that additional stocks of about 25,000 tons of food would be sufficient to supplement local stocks and production during a period of 60 days without imports. This

requirement might be reduced by increasing utilization and production of some local products, such as vegetables, bananas, fish and animal feeds.

The city of San Juan is listed as one of the critical target areas. Its population in 1950 was 224,767, about 10 percent of the total in Puerto Rico. San Juan is the prinipal port and is the site of a large portion of the storage facilities for imported foods. Available information indicates that there is relatively little unused storage space suitable for food or grain on the Island.

Many of the imported food items are suitable for inclusion in a food stockpile if such a stockpile is found necessary. As in other areas, problems of storage and rotation of stocks would need to be solved before any stockpiling should be undertaken.

Virgin Islands: Total food imports of the Virgin Islands are relatively small, about 6,500 tons in 1955, of which about four-fifths normally comes from the United States. The largest items of imported foods are wheat flour, rice, evaporated and condensed milk, white portatoes, meat, lard and canned fruits and vegetables. Since there are no major military targets in the area, the need for stockpiling would be to guard against interruption of transportation. If any stockpiling in such an area could be justified, it would appear to be limited to relatively small quantities of easily storable items such as rice, wheat for flour, condensed, evaporated or dry milk and vegetable oils. Fruits and vegetables are not produced in sufficient quantities to meet local needs and some are imported. Potatoes cannot be grown or stockpiled satisfactorily on the islands. There is some storage space that would be available for a stockpile of food.

Guam: Imports of food are high relative to local food production and nearly all imports come from the United States. Annual food import needs include about 4,750 tons of rice, 1,500 tons of milk, 1,250 tons of sugar, 850 tons of flour, 1,300 tons of corn and chicken feed, 1,850 tons of frozen meat, 400 tons of frozen fish, about 4,200 tons of fresh fruits and vegetables and about 4,400 tons of other foods (including coffee, cheese, canned fruits and vegetables, eggs, etc.).

Guam is relatively distant from the continental United States and in an area where transportation might be a problem in a war emergency. Stockpiling of food in this area appears to deserve serious consideration, even though annual food imports total only about 20,500 tons. A relatively small stockpile of non-perishable food items might be desirable if there

is suitable storage, and if rotation problems and other possible difficulties can be solved. Annual shipments of rice, sugar and flour to Guam amount to about 230 pounds per capita of its population, compared to a total per capita consumption of 223 pounds of these items per year in the U. S.

Normal stocks of imported foods are estimated to be sufficient to meet the needs of the people for a period of about 20 to 60 days, depending on the item. It is estimated that additional stocks of about 2,500 tons would be needed to protect the island against serious shortages during a period of 90 days without imports. Available information indicates that adequate storage space is available for this additional amount of food in a stockpile. The amount needed for civilian food stockpile may depend to some extent on the size of the military stocks on the Island.

Trust Territories and American Samoa: Annual imports of food into the Trust Territories and American Samoa are estimated at about 1,000 tons from United States and about 4,000 tons from nearby areas. The bulk of the rice, sugar and flour come from sources outside of the United States because of the shorter hauls and the trade routes in the area. Canned beef, milk and beans are among the more important imports from United States. Military movements of both men and food into the area would likely increase requirements in wartime. The factors limiting the practicability of stockpiling include lack of suitable storage facilities and the high humidity which causes rapid deterioration of stored items.

Stocks of imported foods are estimated to be sufficient to meet the requirements of the population for about 60 days. Some stockpiling of foods might be desirable, if shipments to the Islands from the United States or from other sources were likely to be delayed longer than 60 days.

FOOD STOCKPILING IN FOREIGN AREAS

The Department has studied the question of strategic stockpiling of food and other agricultural products abroad and especially the problems involved in carrying out the provisions of Section 415 of the Mutual Security Act of 1954. Lack of adequate funds has so far prevented any action under this Section. Various considerations of the problems of strategic stockpiling in foreign countries are presented below, however, including the possibilities of using surpluses for building up stocks in the countries in the NATO area.

It is recognized that the problems of stockpiling in foreign areas are far more comprehensive than a mere consideration of the disposal and acquisition of surplus agricultural commodities. Such stocks in foreign areas would create even greater problems than those referred to earlier in this report in respect to the difficulties and costs of stockpiling for emergency use in the Continental United States. In most cases the actual surpluses would represent only the first step in developing such a program, with the total cost several times greater than the cost of the agricultural items involved.

Then, too, the need for defense stockpiling cannot be fully appraised in any precise way since detailed information is lacking on such essential points as food processing facilities, location and size of warehouses, and quantities in present commercial and military stocks. Nevertheless, based on the known dependence of many NATO countries on imports and other factors, it is possible to make some rough estimates on the apparent need for emergency food reserves.

Situation in Western Europe

Western Europe is the world's great food importing region. In recent years, about one-fourth of the caloric value of all food consumed has been derived from imports.

On a tonnage basis, grains for food and feed are by far the major import item for Western Europe; in 1955 net imports totalled nearly 18,000,000 metric tons. Imports of oilseeds, oils, fats, and oilcake are also very large. Other major import items include sugar, fruit, and meat.

Within Western Europe, the degree of self-sufficiency varies widely. At one extreme, the United Kingdom produces little more than one-third of the caloric value of its food supplies, and at the other, Denmark produces nearly one-third more than it consumes. For the area embracing the United Kingdom, West Germany,

the Low Countries, and France, within whose borders are found the vulnerable industrial core of Western Europe and nearly 60 percent of its population, the degree of food self-sufficiency is something less than two-thirds. These five countries absorb the bulk of West Europe's imports of food and feed, and their large ports also receive substantial quantities to be transshipped to other countries.

Experiences during two world wars in the past fifty years have driven home to most European countries their vulnerability and the need for defense food stockpiling. Various governments have takensteps to meet this need, and a few figures on stocks are available. Government holdings of wheat in Italy for price support purposes total some 2,000,000 metric tons; the government plans to reduce them to about 1,000,000 tons which is the equivalent of a two to three-month's market supply. Landlocked Switzerland is said to have reserves of 400,000 metric tons of breadgrains, or a ten-month's market supply. Some reserve stocks are known to be held in the United Kingdom, West Germany, Belgium, Norway, and Sweden.

While many countries appear to have bulk stockpiling of grain and probably some other foods well in hand, there is no indication as to progress in dispersing these stocks in strategic locations, or in building up strategic stocks of specially prepared and packaged foods. Probably little has been made. The cost of building storage facilities, processing the food, and maintaining the stockpile in good condition is a serious obstacle to action on any large scale, even if the technical and other aspects of the problem had been fully worked out.

The physical problems of stockpiling for emergency use are less difficult for non-food items and probably receive considerably less governmental attention. Cotton, for example, is largely in private hands and there are no known government plans for strategic stockpiles. The situation is similar for most other fibers and tobacco.

General Considerations

In discussions of strategic stockpiles it has always been pointed out that, because of the type of protection such stockpiles ought to give, the share of the total expenditure for basic foods such as wheat probably would not exceed 15 to 20 percent of the total cost. This is because of the probable necessity, in many cases, of adding other foods, processing them into "ration" type foods, special dehydration, special packaging, storage, and shipping. Because of such special forms in which these stocks would be held, it is considered that they would not displace ordinary commercial shipments to, or stocks in, those countries.

The building up of strategic stockpiles in foreign countries or of a central stockpile in friendly areas is an operation that should be primarily determined by the security needs of the United States and cannot be initiated from the point of view of surplus disposal. With respect to all such strategic stockpiling, the Department will always be anxious to comply with any supply requirements for such a purpose, as determined by the appropriate Defense and Foreign Policy authorities. The Department will be happy if any programs initiated for this purpose will contribute to surplus disposal.

Careful joint study and planning with the different countries concerned would be needed in order to determine the size and location of such stockpiles, either Central Area or National. If in the end agreement were reached to stock a 30-day ration of about 2,000 calories per person per day, and if this ration consisted only of flour, sugar, lard, and some dried skim milk for children, it could be calculated that total requirements for, say, some 46,000,000 persons 1/ would come to about 550,000 metric tons of flour; 125,000 metric tons of sugar; 50,000 metric tons of lard; and 2,000 metric tons of dried skim milk. Calculations of costs, including allowance for processing, dehydration, special packaging and the like, but not shipping or storage, indicate a total of $172,000,000. These figures are intended merely to illustrate a possibility for surplus disposal through strategic stockpiling that might open up eventually if the United States undertook to finance such a stockpile for NATO. Much more information would be necessary in order to make any realistic evaluation of stockpiling needs and costs.

If stocks of unprocessed surpluses were simply increased in NATO countries and held at higher levels they would not meet the test of readiness for emergency use. However, such increased stocks would be important to those countries if ocean shipping should become seriously disrupted. This possibility has been given more recognition recently. From the standpoint of the United States, such stockpiles would cost less and bear more directly on the liquidation of surpluses. Public Law 480, if renewed and extended, would be particularly suited for this purpose. Inquiries relative to the use of surpluses in this way have already been made by individual NATO countries.

Up to the present the position foreign countries have in general taken implies that they would not be able to take substantial agricultural surpluses for strategic stockpiling in their

1/ A figure roughly equal to the population in cities of over 100,000 inhabitants in the United Kingdom, West Germany, France and the Low Countries, or 16 percent of the total population of Western Europe.

countries unless the United States were willing to pay for most or all of the costs of acquiring, processing, packaging and maintaining such stockpiles. The same has been the position regarding the possibility of establishing a strategic central area stockpile for use by more than one country, as for example, the NATO area. It appears possible that under the impact of recent international developments, countries that are financially in a strong position may reconsider the problem of strategic stockpiling and develop greater interest in building up national strategic stockpiles of their own if U.S. agricultural surpluses are made available on favorable financial terms.

Legislative Authority

As regards U.S. assistance, Section 415 of the Mutual Security Act offers adequate legislative basis but only on condition that sufficient funds would be appropriated under Sections 131 and 403 of this Act to provide for the specific purposes set forth in these two sections and for assistance in strategic stockpiling of foodstuffs and other supplies.

Section 131 authorizes the President "to furnish, to nations and organizations eligible to receive military assistance under chapter 1 of this title, or to nations which have joined with the United States in a regional collective defense arrangement, commodities, services, and financial and other assistance designed to sustain and increase military effort. In furnishing such assistance, the President may provide for the procurement and transfer from any source of any commodity or service (including processing, storing, transporting, marine insurance, and repairing) or any technical information and assistance."

Section 403 authorizes the President "to furnish commodities, services, and financial and other assistance to nations and areas for which the United States has responsibility as a result of participation in joint control arrangements where found by the President to be in the interest of the security of the United States."

The following amounts have been appropriated under these two sections for 1956-57: (a) under Section 131 - $68.7 million for Europe with $50 million earmarked for Spain and (b) under Section 403 - $12.2 million. It is understood that no funds available under these sections have been used for the purposes specified in Section 415.

The applicability of Public Law 480 to strategic stockpiling outside the United States is described later.

Disposal of Surpluses by Building up Reserves Abroad

Among the purposes for which surplus agricultural commodities can be used are (a) the establishment in underdeveloped countries of national reserves to be used against crop failures and other emergencies, as well as for meeting shortages which may develop as a result of population increases and economic development programs; and (b) the establishment of strategic stockpiles by friendly nations or organizations of friendly nations.

The United States has participated in a FAO study of the problems involved in building up of national reserves. In the course of these studies and in other appraisals of the problem several suggestions came forward for building up reserves of food and other agricultural commodities which would be required in the event of international emergencies.

One such suggestion involves the transferring and storage by the United States of surplus stocks in areas more strategically located from the standpoint of future need in the event of international emergencies. This proposal would place the United States in the position of maintaining the responsibility for storage, rotation and disposition of such stocks under unfavorable circumstances. Because of their very location, their eventual disposition could not be completely controlled. Similarly, the existence of these stocks in a country would offer opportunities to normal importers of U. S. agricultural commodities to be less careful of maintaining stocks, and conversely to offer opportunities to countries which are normally exporters of commodities competitive with the United States to strain their own supplies in order to keep exports high. Furthermore, the presence of large U. S. stocks of such commodities in countries where they would be readily available in case of emergency would undoubtedly serve to relieve these countries of their responsibility for developing their own inventories in the light of their own needs. Therefore, it is considered undesirable to entertain proposals for the supply of agricultural commodities for strategic stockpiling abroad except under circumstances where the ownership of these commodities would be transferred under satisfactory arrangements.

In consideration of various suggestions for stockpiling under international control, foreign countries have generally indicated that they would expect the United States to pay for most or all of the cost of establishing and maintaining any strategic stockpiles. Furthermore, most of the agricultural commodities that would be useful for such purposes would

require a certain amount of rotation and the countries and organizations which have worked on this problem have indicated that they would not be willing to take on the problems of conducting such operations unless the commodities going into the stockpile were accompanied by substantial financial assistance of which the only apparent source is the United States. The proposal for international control has inherent in it also the problem that it would inevitably minimize the necessity for countries themselves to provide reserves against emergencies. It would also provide the same opportunities for minimizing imports and maximizing exports which the proposal for U. S. ownership abroad would provide.

There are, however, important possibilities for assistance in building up National reserves of agricultural commodities which are in surplus in the United States through programs authorized by Public Law 480. Title I of this Act permits the sale of surplus agricultural commodities for foreign currencies and Section 104 thereof authorizes the use of the foreign currencies received for a wide variety of purposes. Among these is the promoting of economic development which would include the building up of National reserves including strategic stockpiling. Part of the local currency received can be loaned back pursuant to Section 104(g) to the country on a long-term basis at low interest rates in order to facilitate the building of storage facilities and the handling of reserves. Loans are made for periods up to 40 years with a three-year interest free period. Interest is 3 percent if repayment is made in dollars and 4 percent if payment is made in local currency. Grants may be made for the partial financing of reserves under Section 104(e) as economic development where the President waives the applicability of Section 1415 of the Supplemental Appropriation Act of 1953 after having determined, in accordance with the proviso to Section 104, that Section 1415 "would be inappropriate or inconsistent with the purposes of this title." Grants also could be made under Section 104(c) to the extent that strategic stockpiles and storage facilities for such stockpiles are considered necessary for the common defense. The use of substantial amounts of the available funds for these purposes has to be weighed against alternative uses which are of interest to the countries concerned and to the United States.

In general, disposals which result in increasing consumption are considered more effective from the standpoint of liquidating surpluses than those which would result primarily in moving the stocks abroad. In a number of cases, however, the building up of stocks abroad has been authorized as an effective disposal of CCC stocks. Where the transfer of ownership is final and the increase in reserves can be considered as

being on a relatively long-term basis, the disposal of U. S. surpluses in this manner is often in the interest of the United States even though immediate consumption of the surpluses is not achieved. For example, in cases where trade stocks in importing countries have fallen to low levels, increases in stocks often permit a higher level of marketings and consumption than could otherwise be maintained. The Title I, Public Law 480, sales of tobacco in the United Kingdom illustrate this type of program. Other instances of authorizing sales for reserves or stockpiling include wheat to India. The authorities in subparagraphs (c) and (e) of Section 104 referred to above have been utilized in those instances where appropriate in the interest of the United States. Title II of Public Law 480 authorizes surplus agricultural commodities to be made available "to meet famine or other urgent or extraordinary relief requirements" of friendly nations or populations. However, it is doubtful that stockpiling to meet emergencies which might arise in the future would be authorized under this provision.

It should be noted that the authority in Titles I and II of Public Law 480, as amended, expires on June 30, 1957, unless extended by the U. S. Congress. Moreover, of the $3 billion authorized for use under Title I of Public Law 480, as amended, $2.6 billion had been committed by December 14, 1956, and additional sales agreements are in progress of negotiations which, if consummated, would commit most of the remainder of these funds.

Table 1: Safe Keeping Time of Some Non- or Semi-Perishables Suitable for Stockpiling 1/

Product	Packaging	Months keeping time at: 40° F.	70° F.	Remarks
Coffee, green	bags	60	48-60	Listed keeping time is conservative
Cocoa	bags	48-60	24	Will absorb odors
Tea, black leaf	suitable containers	36-48	12-18	Should be kept cool and dry
Yeast, bakers active dry	canned	36-48	18	
Flour, wheat	multi-wall bags	24	9-12	Requires low humidity
Rice, parboiled	laminated paper bags	60	36	Requires low humidity
Spices and herbs	cans	48-60	24	Loss of flavor at high temperature
Milk, dry non-fat	canned	36-60	12-24	May cake
Milk, evaporated or condensed	canned	24	12	
Cheese, American	canned	60	30-36	
Salad oil	canned	36-48	12	
Shortening, hydrogenated	canned	36-60	18-24	
Margarine	canned	60	24	
Sugar, granulated	cotton or paper bags	indef-inite	indef-inite	Will cake if humidity is high
Canned fruits	canned	36-60	6-24	Can may rust
Fruit juices	canned	36	6-9	Can may rust
Meat, beef	canned	60	36-40	
Meat, pork	canned	48	30	
Meat and vegetables	canned	48-60	24-48	

1/ Taken from Army Technical Manual No. 743-200, Changes No. 2.

Table 2: 1956 Stocks of U. S. Farm Products as Percent of 1956 Domestic Civilian Utilization By Quarters, Including Non-Food Uses

Item	Civilian Use Per Capita 1/	Percent of 1956 Needs in Stock 2/			
		1-1-56	4-1-56	7-1-56	10-1-56
	(pounds)				
Meats, Poultry and Fish:					
Carcass meat	162.0	2.4	2.6	2.0	1.5
Fresh & Frozen Fish (1955)	5.8	14.5	13.1	14.6	20.1
Poultry, ready-to-cook	28.9	4.5	3.1	2.5	4.7
Eggs, fresh equiv.	47.5	1.5	1.2	3.6	2.4
Fats and Oils:					
Butter	9.1	10.2	5.5	7.1	5.7
Margarine	8.0	1.8	1.9	1.9	1.6
Shortening, incl. lard	21.3	7.3	8.9	9.3	6.3
Other fats & oils	10.1	56.3	47.6	43.3	46.8
Other Dairy Products: 3/					
Cond. & evap. milk	15.7	8.1	4.6	12.3	16.4
Dry milk (non-fat)	5.9	8.6	9.6	14.6	32.2
Cheese (aged only)	7.8	39.4	34.7	39.6	40.9
Fruits and Vegetables: 4/					
Fresh & frozen fruit & juice	108.4	11.8	6.0	5.1	8.4
Canned fruit & juice	33.8	40.9	26.6	14.6	n.a.
Dried & evap. fruit	4.2	17.0	5.1	6.5	5.8
Potatoes, white & sweet	139.0	38.6	21.1	3.4	63.2
Other fresh & froz. veg.	149.8	4.0	2.5	1.9	7.2
Canned vegetables	42.0	64.2	14.1	18.8	n.a.
Baby food	4.0	49.3	40.5	36.7	44.1
Dry beans and peas	8.4	77.6	77.7	44.8	n.a.
Other Foods: 4/					
Wheat and Rye (grain equiv.)	223.3	251.6	215.7	168.3	289.0
Rice (milled equiv.)	5.3	370.1	345.5	239.4	324.4
Sugar, cane & beet (ref. val.)	95.0	27.2	20.5	16.6	10.4
Peanuts (kernel basis)	4.5	13.2	57.5	34.0	38.0
Coffee, (green basis)	15.4	13.2	13.2	13.2	13.2
Tea	0.6	42.0	n.a.	n.a.	n.a.

1/ Includes non-food uses and excludes exports. Product weights at the primary distribution level, except where indicated otherwise.
2/ Stocks in all positions, except in retail and wholesale establishments.
3/ Does not include products used fresh or frozen.
4/ Based partially on unofficial estimates of stocks.

Table 3: Per Capita Amounts, Per Day, of Foods Consumed by Civilians, Caloric Value and Dollar Value at Retail Level in the United States in 1955

	Amounts Per Capita 1/			Percent of Total	
	Product: Weight (Ounces)	Calories	Retail Value 2/ (cents)	Calories (percent)	Value (percent)
Daily Produced Foods:					
Beef, pork, veal & lamb 3/	6.0	499	23.4	15.5	28.5
Edible offal	.5	20	4/	.6	4/
Lard	.4	112	.6	3.5	.7
Butter	.4	79	1.6	2.5	1.9
Margarine	.4	72	.6	2.2	.7
Fluid milk and cream & ice cream (milk equiv.)	17.5	307	11.3	9.5	13.8
Other dairy products	4.4	142	2.9	4.4	3.5
Chicken & turkey, pan ready	1.1	54	4.0	1.7	4.9
Eggs (shell equiv.)	1 egg	83	4.4	2.6	5.4
Fish (fresh and processed)	.5	18	.7	.6	.9
Sub-total		1,386	49.5	43.1	60.3
Foods Having Long Harvest Season:					
Potatoes, white	4.3	85	1.4	2.6	1.7
Vegetables, fresh, commercial	4.4	30	4.6	.9	5.6
Vegetables, fresh, home garden	3.6	27	4/	.9	4/
Sub-total		142	6.0	4.4	7.3
Foods With Short Harvest Season:					
Vegetables, processed	2.6	30	4.4	.9	5.4
Fruits, fresh, commercial	5.3	57	3.1	1.8	3.8
Fruits, processed	2.6	58	2.7	1.8	3.3
Shortening & vegetable oils	.9	234	1.1	7.3	1.3
Sweet potatoes	.4	11	.2	.3	.2
Flour, all (from grains)	5.3	552	3.8	17.2	4.6
Other grain products (excl. sweets)	1.2	143	1.1	4.4	1.3
Sugar, refined (beet, cane, corn)	4.1	452	2.7	14.0	3.3
Dry beans and peas	.4	34	.5	1.1	.7
Bakery products 5/	5/	5/	5.1	4/	6.2
Other foods 6/	1.7	120	1.9	3.7	2.3
Sub-total		1,691	26.6	52.5	32.4
TOTAL		3,219	82.1	100.0	100.0

1/ Amounts are estimated at the retail level and are not adjusted for loss or waste beyond that level.

2/ Values are based on 1955 average retail prices, and include most home produced foods and imported foods.

3/ Includes bacon and salt side (0.8 oz. and 152 calories). 4/ Not available.

5/ The weight, calories and value of ingredients in bakery products have been deleted from data for bakery products to avoid duplication, leaving only the estimated value added by manufacture and distribution.

6/ Other foods include sweets (other than beet, cane and corn sugar), nuts, soya flour, chocolate, and home garden products, n.e.c., except no value is included for the latter.

1-2-57

Table 4: Imports For Consumption of Major Agricultural Products
Calendar Year 1955 1/

Commodity	Unit in 1,000's Prod. wt.	Supplementary	Complementary	Total	Total in Thousand Short Tons
Sugar, cane	Sh. T.	3,902.7	--	3,902.7	3,902.7
Molasses and sugar syrup	Gal.	388,894.2	--	388,894.2	2,288.3
Unfit for human consumption	Gal.	377,812.0	--	377,812.0	2,223.4
Other	Gal.	11,082.2	--	11,082.2	64.9
Coffee	Lb.	--	2,599,201	2,599,201	1,299.6
Coffee, green	Lb.	--	2,598,292	2,598,292	1,299.1
Coffee, roasted	Lb.	--	909	909	0.5
Tea	Lb.	--	104,628	104,628	52.3
Cocoa, prepared	Lb.	--	70,888	70,888	35.4
Cocoa beans	Lb.	--	499,664	499,644	249.8
Shells of cocoa beans	Lb.	--	3,444	3,444	1.7
Chocolate, prepared	Lb.	--	30,118	30,118	15.1
Wool, all, unmfg.	Lb.	181,475	185,958	367,433	183.7
Hides & skins, raw, except furs	Lb.	127,466	--	127,466	63.7
Cotton and linters	(489 lb.) Bale	392.0	--	392.0	94.1
Cotton	"	188.8	--	188.8	45.3
Linters	"	203.1	--	203.1	48.8
Abaca or Manilla	L.T.	--	34.8	34.8	39.0
Jute	L.T.	52.3	--	52.3	58.6
Jute, unmfg.	L.T.	47.5	--	47.5	53.2
Jute, Butts	L.T.	4.9	--	4.9	5.5
Hemp Tow	L.T.	.1	--	.1	.1
Hemp, not hackled	L.T.	.1	--	.1	.1
Sisal and Henequen	L.T.	--	147.4	147.4	165.0
Oil seeds	Sh.T.	400.6	--	400.6	400.6

1/ Source: Report No. Ft. 110 "United States Imports of Merchandise for Consumption", for Calendar Year 1955, issued May 1956 by U. S. Department of Commerce, Bureau of the Census.